

Covered Source Permit Review Summary

Application No.: Significant Modification Application No. 0072-09
Renewal Application No. 0072-10

Permit No.: 0072-01-C

Applicant: Aloha Petroleum, Ltd.

Facility: Hilo West Terminal
661 Kalanianaʻole Avenue, Hilo, Hawaii

Mailing Address: Aloha Petroleum, Ltd.
661 Kalanianaʻole Avenue
Hilo, Hawaii 96720

Responsible Official: Mr. Kelvin Chun
Terminal Manager
(808) 935-8288

Point of Contact: Mr. Kelvin Chun
Terminal Manager
(808) 935-8288

Application Dates: Significant Modification application received on November 4, 2013
Renewal application received on April 23, 2014

SICC: 5171 (Petroleum Bulk Stations and Terminals)

Background:

The Aloha Petroleum Hilo West Terminal currently operates ten (10) above-ground storage tanks, seven (7) of which have a capacity greater than 40,000 gallons. The facility currently has six (6) internal floating roof tanks (Tank nos. 1, 4, 5, 6, 7, and 8) and four (4) fixed roof tanks (Tank nos. 3, 9, 10, and Additive). There are no underground storage tanks at the facility.

The bottom-loading petroleum tank truck loading rack at the Aloha Petroleum Hilo West Terminal is a one-lane load rack currently equipped with four (4) loading arms, three (3) for gasoline or ethanol and one (1) for distillate or biodiesel products. The load rack operates on a continuous basis (24 hrs/day, 365 days/year). Each arm loads at approximately 350 gallons per minute.

Proposed Project:

Significant Modification Application No. 0072-09 and Renewal Application No. 0072-10

The applicant proposes to modify the current terminal's throughput limits of 62,000,000 gallons (1,476,190 barrels) per rolling twelve month (12-month) period for gasoline and ethanol combined and 7,500,000 gallons (178,571 barrels) per rolling twelve month (12-month) period for distillate products to a maximum throughput of 300,000,000 gallons (7,142,857 barrels) per rolling twelve month (12-month) period for petroleum products.

PROPOSED

The applicant also proposes to install and operate a 54 MMBtu/hr John Zink thermal oxidizer vapor combustion unit (VCU) currently installed at the Aloha TFM Barber's Point Terminal (CSP No. 0220-01-C) to control VOC emissions from the petroleum tank truck loading rack and to comply with 40 CFR Part 63, Subpart BBBBBB, with the new throughput limit. Also, new pumps will be installed at the petroleum tank truck loading rack to allow loading up to 600 gallons per minute for each arm.

Equipment:

1. Petroleum storage tanks:
 - a. Tank no. 1 - 10,000 barrel internal floating roof tank;
 - b. Tank no. 4 - 5,500 barrel internal floating roof tank;
 - c. Tank no. 5 - 2,400 barrel internal floating roof tank;
 - d. Tank no. 6 - 5,600 barrel internal floating roof tank;
 - e. Tank no. 7 - 12,700 barrel internal floating roof tank; and
 - f. Tank no. 8 - 25,000 barrel internal floating roof tank.
2. One (1) bottom loading petroleum tank truck loading rack with four product arms (three (3) for gasoline or ethanol, one (1) for distillate or biodiesel product).
3. One (1) 54 MMBtu/hr John Zink thermal oxidizer vapor combustion unit, model no. ZCT-3-8-45-X-2/8-2/8-X with a thirty-five foot (35') exhaust stack height.

Air Pollution Controls:

VOC emissions from the petroleum storage tanks and petroleum tank truck loading rack are controlled by the design characteristics of the tanks and load rack. The petroleum storage tanks have internal floating roofs with primary seals and the petroleum tank truck load rack is bottom loading. In addition, the proposed thermal oxidizer vapor combustion unit will control VOC emissions from the petroleum tank truck load rack.

Operational Limits:

The petroleum storage tanks do not have throughput limits. The applicant is proposing a maximum throughput limit for the petroleum tank truck loading rack of 300,000,000 gallons (7,142,857 barrels) per rolling twelve month (12-month) period for petroleum products.

Applicable Requirements:

Hawaii Administrative Rules (HAR)

Title 11, Chapter 11-59, Ambient Air Quality Standards

Title 11, Chapter 11-60.1, Air Pollution Control

Subchapter 1, General Requirements

Subchapter 2, General Prohibitions

11-60.1-31 Applicability

11-60.1-39 Storage of Volatile Organic Compounds

Subchapter 5, Covered Sources

Subchapter 6, Fees for Covered Sources, Noncovered Sources, and Agricultural Burning

11-60.1-111 Definitions

11-60.1-112 General Fee Provisions for Covered Sources

- 11-60.1-113 Application Fees for Covered Sources
- 11-60.1-114 Annual Fees for Covered Sources
- 11-60.1-115 Basis of Annual Fees for Covered Sources
- Subchapter 8, Standards of Performance for Stationary Sources
- Subchapter 9, Hazardous Air Pollutant Sources

Federal Requirements

- 40 CFR Part 60 – Standards of Performance for New Stationary Sources (NSPS)
 - 40 CFR Part 60, Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984 - is applicable to Tank no. 5 due to the conversion of tank no. 5 to an internal floating roof tank storing gasoline or ethanol.
- 40 CFR Part 63 – National Emission Standards for Hazardous Air Pollutants for Source Categories (Maximum Achievable Control Technologies (MACT) Standards)
 - 40 CFR Part 63, Subpart BBBBBB - National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities - is applicable to all tanks in gasoline service (Tank nos. 1, 4, 5, 6, 7, 8), the petroleum tank truck load rack, and fugitive components in gasoline service. Currently, per Table 2 of Subpart BBBBBB, the gasoline load rack has a total throughput of less than 250,000 gallons per day and as an existing facility, is required to be in compliance no later than January 10, 2011. Per the requirements in Table 2 of Subpart BBBBBB, the facility is in compliance as it uses submerged filling with a submerged fill pipe (no more than six (6) inches from the bottom of the cargo tank) and keeps records of all throughputs that are available upon request. With the proposed change to 300,000,000 gallons per day of petroleum products, the load rack could potentially have a gasoline throughput of greater than 250,000 gallons per day. Per Table 2 of Subpart BBBBBB, the requirement is to equip the load rack with a vapor collection system to collect the TOC vapors displaced from cargo tanks during product loading and to reduce emissions of TOC to less than or equal to 80 mg/l of gasoline loaded into gasoline cargo tanks at the loading rack. The proposed thermal oxidizer vapor combustion unit will be used for compliance with this requirement with TOC emissions not to exceed 35 mg/l of gasoline loaded.

Non-Applicable Requirements:

Hawaii Administrative Rules (HAR)

- Title 11, Chapter 11-60.1, Air Pollution Control
 - Subchapter 7, Prevention of Significant Deterioration Review
 - Subchapter 9, Hazardous Air Pollutant Sources

Federal Requirements

- 40 CFR Part 60 – Standards of Performance for New Stationary Sources (NSPS)
 - 40 CFR Part 60, New Source Performance Standards (NSPS) Subparts K, Ka, and Kb - Standards of Performance for Storage Vessels for Petroleum Liquids - are not applicable to the facility (except as noted for Tank no. 5 above) because the construction dates are before the subparts were promulgated. The addition of floating roofs to Tank nos. 1, 4, 6, and 7, does not trigger a modification because the tanks were capable of storing gasoline prior to the addition of the floating roofs. For the same reason, Tank no. 8 did not trigger

PROPOSED

Subpart Kb applicability when the product stored was switched from aviation fuel to gasoline in 1984.

40 CFR Part 60, New Source Performance Standards (NSPS) Subpart XX - Standards of Performance for Bulk Gasoline Terminals - is not applicable because of the construction date of the tank truck load rack. Although the initial construction date is not known, it is assumed that the load rack was in place when the storage tanks were built. The load rack was converted from a top-loading to bottom-loading in 1991. The conversion is not considered a modification because the cost of the conversion was less than half the cost of building a new loading rack. The proposed conversion of a gasoline loading arm to a diesel loading arm also does not trigger Subpart XX. The installation of the VCU will result in a decrease in VOC emissions on an hourly and annual basis; therefore Subpart XX is not triggered.

40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAPS)

40 CFR Part 63 – National Emission Standards for Hazardous Air Pollutants for Source Categories (Maximum Achievable Control Technologies (MACT) Standards)

40 CFR Part 63, Subpart R - National Emission Standards for Hazardous Air Pollutants for Gasoline Distribution Facilities - is not applicable to the facility because the facility is not a major source of HAPs.

Best Available Control Technology (BACT):

A Best Available Control Technology (BACT) analysis is required for new covered sources or significant modifications to covered sources that have the potential to emit or increase emissions above significant amounts as defined in HAR §11-60.1. A BACT analysis for the modification consisting of the petroleum tank truck loading rack with a thermal oxidizer vapor combustion unit and an increase in the maximum throughput of the terminal is not applicable. See table below.

Pollutant	Post-Project Potential Emissions ¹ (tpy)	Pre-Project Potential Emissions ² (tpy)	Emissions Increase (tpy)	Significant Level (tpy)	Significant?
NO _x (loading rack)	2.81	0	2.81	40	No
SO ₂ (loading rack)	1.64	0	1.64	40	No
CO (loading rack)	14.94	0	14.94	100	No
PM (loading rack)	2.02	0	2.02	25	No
PM ₁₀ (loading rack)	2.02	0	2.02	15	No
VOC (loading rack)	68.67	225.03	-156.63	40	No
VOC (tanks)	19.02		19.02	40	No

¹Post-project potential emissions are based on a proposed maximum throughput of 300,000,000 gallons (7,142,857 barrels) per rolling twelve month (12-month) period for petroleum products.

²Pre-project potential emissions are based on the current facility's throughput limits of 62,000,000 gallons (1,476,190 barrels) per rolling twelve month (12-month) period for gasoline and ethanol combined and 7,500,000 gallons (178,571 barrels) per rolling twelve month (12-month) period for distillate products.

Compliance Assurance Monitoring (CAM):

The purpose of Compliance Assurance Monitoring (CAM) is to provide a reasonable assurance that compliance is being achieved with large emissions units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 CFR Part 64, for CAM to be applicable, the emissions unit must: (1) be located at a major source; (2) be subject to an emissions limit or standard; (3) use a control device to achieve compliance; (4) have potential

pre-control emissions that are 100% of the major source level; and (5) not otherwise be exempt from CAM. CAM is not applicable because this is not a major source.

Air Emissions Reporting Requirements (AERR):

40 CFR Part 51, Subpart A – Air Emissions Reporting Requirements, is based on the emissions of criteria air pollutants from Type B point sources (as defined in 40 CFR Part 51, Subpart A), that emit at the AERR triggering levels as shown in the table below.

Pollutant	Type B Triggering Levels ¹ (tpy)	Pollutant	In-house Total Facility Triggering Levels ² (tpy)	Potential Emissions (tpy)
NO _x	≥ 100	NO _x	≥ 25	2.81
SO _x	≥ 100	SO _x	≥ 25	1.64
CO	≥ 1000	CO	≥ 250	14.94
PM ₁₀ /PM _{2.5}	≥ 100/100	PM/PM ₁₀	≥ 25/25	PM/PM ₁₀ /PM _{2.5} = 2.02
VOC	≥ 100	VOC	≥ 25	87.80
Pb	≥ 5	Pb	≥ 5	0
		HAPs	≥ 5	12.25

¹Based on actual emissions

²Based on potential emissions

This facility does not emit at the AERR triggering levels. Therefore, AER requirements are not applicable.

Although AERR for the facility is not triggered, the Clean Air Branch requests annual emissions reporting from those facilities that have facility-wide emissions of a single air pollutant exceeding in-house triggering levels or is a covered source. Annual emissions reporting for the facility will be required for in-house recordkeeping purposes since this is a covered source.

Prevention of Significant Deterioration (PSD):

This source is not a major stationary source nor are there modifications proposed that by itself constitute a major stationary source that is subject to PSD review. Therefore, a PSD review is not applicable.

Synthetic minor:

A synthetic minor is a facility that without operational limitations, emits above the major source triggering levels as defined by HAR §11-60.1-1, but is made non-major by using operational limitations. This facility is a synthetic minor.

Project Emissions:

Gasoline/Ethanol Tanks	Capacity (bbl)	Throughput (gal/yr)
Tank 1	10,000	53,859,964
Tank 5	2,400	12,926,391
Tank 6	5,600	30,161,580
Tank 7	12,700	68,402,154
Tank 8	25,000	134,649,910
Total	57,000	300,000,000

PROPOSED

Distillate/Biodiesel Tank	Capacity (bbl)	Throughput (gal/yr)	VOC Emissions (tpy)
Tank 4	5,500	20,000,000	0.075

Source	Stream	VOC Emissions (tpy)	HAP Emissions (tpy)
Tank 1	gasoline	4.13	0.134
Tank 5	gasoline	1.57	0.054
Tank 6	gasoline	4.35	0.135
Tank 7	gasoline	3.98	0.140
Tank 8	gasoline	4.99	0.181
Tank Totals	gasoline	19.02	0.644
Truck Load Rack (captured by VCU) ¹	gasoline	43.82	1.161
Truck Load Rack (fugitives, not captured by VCU)	gasoline	24.85	0.658
VCU	gasoline fired		9.758
Pipeline fugitives	gasoline	0.11	0.029
Total Emissions		87.80	12.25

¹Truck load rack emissions based on a vapor recovery emission limit of 35 mg/liter and a throughput of 300,000,000 gallons of gasoline

VCU Criteria Pollutants (gasoline fired)

Pollutants	tpy
CO	14.94
NO _x	2.81
SO ₂	1.64
PM ₁₀	2.02
PM _{2.5}	2.02

Although the applicant calculated the emissions of Tank 4 with jet kerosene, it is capable of storing gasoline/ethanol since it is equipped with an internal floating roof. The emission of VOC for Tank 4 storing gasoline is estimated to be approximately five (5) tpy.

Greenhouse Gas (GHG) Emissions:

Starting July 1, 2011, existing PSD facilities (for another regulated NSR pollutant) or (emitting 100,000 tpy CO₂e) making changes that would increase GHG emissions by at least 75,000 tpy CO₂e, are required to obtain PSD permits that address GHG emissions. GHG emissions associated with the installation and operation of the thermal oxidizer vapor combustion unit are shown below.

Fuel Type	Amount Consumed (MMBtu/yr)	CO ₂ Emissions (MT)	CH ₄ Emissions (MT)	N ₂ O Emissions (MT)
Gasoline	77,440	5,437.82	0.23	0.05
CO ₂ e		5,437.82	4.88	14.40
Propane	946	66.43	0	0
CO ₂ e		66.43	0.06	0.18
CO ₂ e		5,504.25	4.94	14.58

Total CO₂e	5,523.77 MT = 6,088.91 short tons
------------------------------	------------------------------------------

Alternate Operating Scenarios:

The applicant did not list any alternate operating scenarios.

Insignificant Activities:

The applicant identified the following insignificant activities:

- One (1) 2,767 barrel fixed roof tank, tank no. 3; storing distillate products;
- One (1) 143 barrel horizontal fixed roof tank, tank no. 9, storing slop;
- One (1) 13 barrel horizontal fixed roof tank, storing gasoline additive;
- One (1) 140 barrel horizontal fixed roof tank, tank no. 10, storing gasoline additive;
- One (1) CPI oil water separator;
- Pipeline fugitive emissions.

Ambient Air Quality Assessment:

The Department of Health conducted an ambient air quality impact analysis (AAQIA) to determine the emissions impact on the ambient air quality from the proposed John Zink thermal oxidizer vapor combustion unit. The analysis used the EPA's AERSCREEN model to quantify ambient air pollutant impacts in the surrounding area. Using a screening modeling analysis such as AERSCREEN will give more conservative results than using a refined modeling analysis such as AERMOD.

The parameters used in the AERSCREEN model for the VCU consisted of the following:

- Flat terrain option (terrain height below stack base elevation)
- NO_x to NO₂ chemistry = PVMRM
- NO₂/NO_x in-stack ratio = 0.1
- O₃ background concentration = 0.057 ppm
- Rural dispersion
- Downwash effects from warehouse
- Discrete AERSCREEN receptors were set at 9 meters (closest fenceline), and every 25 meters from the stack to 5000 meters
- Meteorology parameters consisting of the following:
 - Min/Max temperature = 291/302 K
 - Minimum wind speed = 0.5 m/s
 - Anemometer height = 10 meters
 - Surface characteristics input = AERMET seasonal tables
 - Dominant surface profile = urban
 - Dominant climate type = average moisture
 - Dominant season = winter
 - Albedo = 0.35
 - Bowen ratio = 1.50
 - Roughness length = 1.00 meters

Potential Downwash-Inducing Structures

Structure	Height (H _b) (ft)	Length (L _b) (ft)	Width (W _b) (ft)	Projected Width (PW) (ft)	L (ft)	H _a = H _b + 1.5L (ft)	5L	Is structure within 5L distance to stack?
Warehouse	19	72	58	92.5	19	47.5	95	yes
Tank No. 1	36+13=49	48	48	48	48	121	240	yes
Tank No. 8	50+13=63	61	61	61	61	154.5	305	yes

Notes:

$$PW = (L_b^2 + W_b^2)^{0.5}$$

L is the lessor of H_b or PW

Emission Rates and Stack Parameters

Equipment	Emission Rates					Stack Parameters			
	NO _x (g/s)	SO ₂ (g/s)	CO (g/s)	PM ₁₀ (g/s)	PM _{2.5} (g/s)	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
VCU	0.081	0.047	0.43	0.058	0.058	10.7	1033	18.4	2.44

Modeled Results for the VCU

Averaging Period	Normalized Concentration for 1 g/s (µg/m ³)
1-hr	160.4
3-hr	160.4
8-hr	144.3
24-hr	96.22
Annual	32.08

^aState of Hawaii default scaling factor of 0.2 for the annual concentrations

Maximum Modeled Impacts for the VCU

Pollutant	Averaging Period	Emission Rate (g/s)	Maximum Modeled Concentration (µg/m ³)
NO ₂	Annual	0.081	2.6
	1-hr	0.081	13.0
SO ₂	Annual	0.047	1.5
	24-hr	0.047	4.5
	3-hr	0.047	7.5
	1-hr	0.047	7.5
CO	8-hr	0.43	62.0
	1-hr	0.43	69.0
PM ₁₀	Annual	0.058	1.9
	24-hr	0.058	5.6
PM _{2.5}	Annual	0.058	1.9
	24-hr	0.058	5.6

The predicted ambient air quality impacts are shown in the table below. The table demonstrates that the impacts of NO₂, SO₂, CO, PM₁₀, and PM_{2.5}, from the VCU plus background air quality levels should not cause or contribute to a violation of any State or National ambient air quality standard.

Predicted Ambient Air Quality Impacts for the VCU

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Measured Background Concentration ^a ($\mu\text{g}/\text{m}^3$)	Maximum Total Concentration ($\mu\text{g}/\text{m}^3$)	AAQS ^b ($\mu\text{g}/\text{m}^3$)	Percent of AAQS (%)
NO ₂	Annual	2.6	6	8.6	75	11.5
	1-hr	13.0	62	75.0	188	39.9
SO ₂	Annual	1.5	18	19.5	80	24.4
	24-hr	4.5	10	14.5	365	4.0
	3-hr	7.5	34	41.5	1300	3.2
	1-hr	7.5	50	57.5	196	29.3
CO	8-hr	62.0	1260	1322.0	5000	26.4
	1-hr	69.0	1832	1901	10000	19.0
PM ₁₀	Annual	1.9	16	17.9	50	35.8
	24-hr	5.6	59	64.6	150	43.1
PM _{2.5}	Annual	1.9	5.6	7.5	12	62.5
	24-hr	5.6	13.3	18.9	35	54.0

^aBackground concentrations are based on the Kapolei Monitoring Station for NO_x (1-hr, annual), SO₂ (1-hr, 3-hr, 24-hr), CO (1-hr, 8-hr), PM₁₀ (24-hr, annual) and PM_{2.5} (24-hr, annual); and Hilo Monitoring Station for SO₂ (annual). The three-year (3-year) maximums from 2010, 2011, and 2012, were used for all pollutants, except for PM_{2.5} which used the three-year (3-year) average.

^bOnly the more restrictive of the National Ambient Air Quality Standards or State Ambient Air Quality Standards are shown.

The existing petroleum storage tanks and petroleum tank truck loading rack also emit fugitive VOCs and any HAPs associated with these VOCs. An ambient air quality impact assessment is not required for the following reasons: 1) VOCs do not have an ambient air quality standard, and 2) the Department of Health air modeling guidance generally exempts an applicant from performing an ambient air quality impact assessment for fugitive sources (storage tanks, pipe leaks, etc.).

Significant Permit Conditions:

Significant permit conditions include the following:

1. Included 40 CFR Part 63, Subpart BBBB, as an applicable regulation for Tanks Nos. 1, 4, 5, 6, 7, 8, and the petroleum tank truck load rack when in gasoline service, and each piece of equipment that transfers gasoline or gasoline vapors.
2. Included 40 CFR Part 60, Subpart Kb, as an applicable regulation for Tank No. 5.
3. Added Special Condition No. A.1.c to Attachment IIB

One (1) 54 MMBtu/hr John Zink thermal oxidizer vapor combustion unit, model no. ZCT-3-8-45-X-2/8-2/8-X with a thirty-five (35) foot exhaust stack height.

4. Added Special Condition No. C.1 to Attachment IIB

The maximum throughput of the petroleum tank truck load rack shall not exceed 300,000,000 gallons (7,142,857 barrels) of petroleum product (gasoline, ethanol, and diesel/biodiesel/distillate) per rolling twelve-months (12- months).

5. Added Special Condition No. C.6.b to Attachment IIB

The emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks shall not exceed thirty-five (35) milligrams of total organic compounds per liter of gasoline loaded.

This limit was requested by the applicant and is more stringent than the 80 mg/l TOC limit as required by 40 CFR Part 63, Subpart BBBBBB.

Conclusion/Recommendation:

Recommend issuing the significant modification/renewal for CSP No. 0072-01-C, subject to the significant permit conditions described above, a 30-day public comment period, and a 45-day EPA review period. This permit shall supersede CSP No. 0072-01-C issued on August 24, 2012 in its entirety.

Reviewer: Darin Lum
Date: 8/2014